

The intervention effect of the Panbrain EC2 on energy

1. Introduction

Energy refers to the enthusiasm and ability of an individual when engaging in cognitive, emotional and physical activities. It is a key factor in maintaining daily life and work. It is closely related to physical strength, mental state, etc. When energy is low, individuals often experience fatigue, which affects cognitive function and the ability to regulate emotions. In modern society, factors such as excessive work pressure, poor lifestyle, and reduced sleep quality may lead to long-term lack of energy, thereby exacerbating the occurrence of fatigue. Therefore, exploring effective intervention methods to restore energy and relieve fatigue has become an important topic to improve health and work efficiency.

Transcranial direct current stimulation (tDCS) is a non-invasive brain stimulation technology that has been proven to be able to regulate the excitability of the cerebral cortex through microcurrent, thereby promoting energy recovery.^[1, 2] This study was conducted based on the Panbrain EC2 (Shenzhen Panbrain Technology Co., Ltd., using tDCS technology), aiming to evaluate the intervention effect of this device in improving energy and relieving fatigue.

2. Experimental method

2.1. General information

Table 1 Comparison of the general information of the two groups of subjects

Group	n	Age (years, $\bar{x} \pm s$)	Gender (n)	
			Male	Female
Stimulation	108	36.54±9.48	72	36
Control	108	38.38±8.95	81	27
t/χ^2		-1.469	1.815	
P		0.143	0.178	

This study recruited social groups. After screening, 216 subjects were finally

included and randomly divided into stimulation group and control group, with 108 subjects in each group. Comparison of general information such as age and gender between the two groups of subjects showed no significant differences. See Table 1.

Inclusion criteria: (1) Frequently felt low energy or fatigue in the past two weeks, and the fatigue evaluation scale score was ≥ 15 points; (2) Age ≥ 18 years old; (3) Voluntary participation and signed informed consent.

Exclusion criteria: (1) suffering from physical or mental illness; (2) suffering from sleep disorders; (3) suffering from contraindications to tDCS.

Exit criteria: (1) Adverse reactions occur during the trial and cannot be alleviated in time; (2) Poor compliance and failure to cooperate in completing all trial arrangements; (3) Voluntary withdrawal due to various emergencies.

2.2. Intervention

The stimulation group uses the Panbrain EC2 for tDCS treatment, and the stimulation site is the dorsolateral prefrontal cortex. Before treatment, first use 0.9% sodium chloride solution to soak the electrode cover, and then gently pinch the electrode cover with your hands to ensure that there is no dripping. Secondly, fix the electrode cover on the electrode. Finally, refer to the 10-20 international standard system, place the anode electrode in the F3 area and the cathode electrode in the F4 area. Each treatment lasted 15 minutes, once a day, 5 days a week, for 4 consecutive weeks (20 sessions).

The operation of the control group was the same as that of the stimulation group, but no current stimulation was applied during the treatment process.

2.3. Evaluation indicators

Before the start of treatment and after the completion of 4 weeks of treatment, the Fatigue Assessment Scale (FAS) and Subjective Vitality Scale (SVS) were used to evaluate the subject's energy status.

FAS has good consistency, reliability and validity. It involves two aspects: physical fatigue and mental fatigue. It contains 10 items in total, each item is scored

from 1 to 5 points, and the total score is from 10 to 50 points. The scale score is directly proportional to the degree of fatigue and inversely proportional to the energy level.^[3-5]

SVS can be used to assess an individual's subjective vitality level, and has been verified to have good reliability, validity and consistency in multiple studies.^[6, 7] The scale contains 7 items and is scored using a 7-point Likert scale, where 1 means "strongly disagree" and 7 means "strongly agree", with a total score of 7 to 49 points.^[8] In order to further analyze the scoring trend, this study negatively transformed the SVS score to generate the SVSR score. The higher the SVSR score, the lower the subjective vitality level of the individual, that is, the individual is more likely to feel lack of energy.

$$SVSR = 49 + 7 - SVS$$

After the scale evaluation, the scores of FAS and SVSR are converted into a percentage system, and the composite score is calculated based on the weight of FAS accounting for 50% and SVSR accounting for 50%. The specific calculation method is as follows:

$$\text{Score} = \frac{\text{FAS}}{50} \times 100 \times 50\% + \frac{\text{SVSR}}{49} \times 100 \times 50\%$$

2.4. Statistical method

Use SPSS 27.0 software for data analysis. Continuous data are expressed as mean $\pm$ standard deviation ($\bar{x} \pm s$), and paired t test and unpaired t test are used; Categorical data are expressed as counts (n) and χ^2 tested. $P < 0.05$ was considered as a statistically significant difference.

3. Test results

Before treatment, there were no statistically significant differences in FAS, SVSR and composite scores between the two groups of subjects ($P \geq 0.05$); after 4 weeks of treatment, the above scores in the stimulation group were significantly lower than before treatment ($P < 0.05$). The FAS and composite scores in the control group

Table 2 Comparison of FAS scores of the two groups of subjects before and after treatment ($\bar{x} \pm s$)

Group	Before	After	<i>t</i>	<i>P</i>
Stimulation	23.06±2.75	14.75±3.01 ^{ab}	23.702	<0.001
Control	23.66±2.52	22.31±2.66 ^a	3.699	<0.001
<i>t</i>	-1.675	-19.565		
<i>P</i>	0.095	<0.001		

Note: Compared with before treatment, ^a*P*<0.05; Compared with the control group, ^b*P*<0.05;

Table 3 Comparison of SVSR scores of the two groups of subjects before and after treatment ($\bar{x} \pm s$)

Group	Before	After	<i>t</i>	<i>P</i>
Stimulation	38.77±4.63	24.68±5.64 ^b	22.095	<0.001
Control	39.68±4.77	37.92±3.77 ^a	3.229	0.107
<i>t</i>	-1.420	-20.293		
<i>P</i>	0.157	<0.001		

Note: Compared with before treatment, ^a*P*<0.05; Compared with the control group, ^b*P*<0.05;

Table 4 Comparison of the composite scores of the two groups of subjects before and after treatment ($\bar{x} \pm s$)

Group	Before	After	<i>t</i>	<i>P</i>
Stimulation	62.62±7.28	39.93±7.97 ^{ab}	24.284	<0.001
Control	64.14±7.18	61.01±6.35 ^a	3.498	<0.001
<i>t</i>	-1.552	-21.489		
<i>P</i>	0.122	<0.001		

Note: compared with before treatment, ^a*P*<0.05; compared with the control group, ^b*P*<0.05;

also dropped significantly, while the SVSR scores did not change significantly ($P \geq 0.05$). The comparison results between groups showed that the score decrease rate of the stimulation group was significantly higher than that of the control group, and the difference was statistically significant ($P < 0.05$). See Table 2-4.

4. Conclusion

This study shows through a randomized controlled trial that after 4 weeks (20 times) of treatment, the Panbrain EC2 using tDCS technology can significantly improve individual energy and effectively relieve fatigue. The results showed that the FAS score of the stimulation group decreased by 36.02% ($P < 0.001$) with a responder rate of 90.74%; the SVSR score decreased by 36.35% ($P < 0.001$) with a responder rate of 87.96%; the composite score decreased by 36.23% ($P < 0.001$) with a responder rate of 91.67%. In contrast, the FAS score of the control group decreased by 5.68% ($P < 0.05$) with a responder rate of 61.11%, the SVSR score decreased by 4.43% ($P = 0.107$) with a responder rate of 57.41%, the composite score decreased by 4.89% ($P < 0.05$) with a responder rate of 60.19%. Comparison between groups showed that the improvement in the stimulation group was significantly better than that in the control group, and the difference was statistically significant ($P < 0.001$). This shows that as a non-invasive neuromodulation device, Panbrain EC2 can provide a safe and feasible intervention option for individuals to restore energy and relieve fatigue.

References

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Appendix A

Table A.1 General information and scores of the two groups of subjects

Group	Subject	Gender	Age	Before treatment				After treatment			
				FAS	SVS	SVSR	Composite score	FAS	SVS	SVSR	Composite score
Stimulation group (1~108)	1	Male	40	23	17	39	62.80	12	38	18	30.37
	2	Male	51	21	20	36	57.73	13	36	20	33.41
	3	Male	41	22	19	37	59.76	15	36	20	35.41
	4	Female	44	24	15	41	65.84	12	30	26	38.53
	5	Female	49	20	21	35	55.71	14	33	23	37.47
	6	Female	18	25	14	42	67.86	16	31	25	41.51
	7	Male	35	26	12	44	70.90	13	36	20	33.41
	8	Female	40	21	20	36	57.73	23	20	36	59.73
	9	Male	43	29	14	42	71.86	16	31	25	41.51
	10	Male	25	15	29	27	42.55	16	29	27	43.55
	11	Male	28	23	16	40	63.82	24	33	23	47.47
	12	Male	44	19	23	33	52.67	11	40	16	27.33
	13	Male	36	24	15	41	65.84	16	29	27	43.55
	14	Female	42	19	23	33	52.67	20	22	34	54.69
	15	Male	28	23	17	39	62.80	15	30	26	41.53
	16	Male	22	22	18	38	60.78	12	33	23	35.47
	17	Female	43	20	22	34	54.69	14	33	23	37.47
	18	Male	47	15	26	30	45.61	19	24	32	51.65
	19	Male	51	27	10	46	73.94	17	28	28	45.57
	20	Female	23	23	16	40	63.82	13	35	21	34.43
	21	Female	25	29	12	44	73.90	15	30	26	41.53
	22	Male	23	23	17	39	62.80	14	35	21	35.43
	23	Male	36	25	14	42	67.86	17	25	31	48.63
	24	Male	31	23	16	40	63.82	16	32	24	40.49

Continued Table A.1 General information and scores of the two groups of subjects

Group	Subject	Gender	Age	Before treatment				After treatment			
				FAS	SVS	SVSR	Composite score	FAS	SVS	SVSR	Composite score
Stimulation group (1~100)	25	Male	48	25	14	42	67.86	12	33	23	35.47
	26	Male	24	21	19	37	58.76	13	35	21	34.43
	27	Male	21	20	26	30	50.61	12	34	22	34.45
	28	Male	38	25	13	43	68.88	17	29	27	44.55
	29	Female	47	20	26	30	50.61	16	25	31	47.63
	30	Male	29	18	27	29	47.59	10	41	15	25.31
	31	Female	25	23	17	39	62.80	12	35	21	33.43
	32	Male	35	24	15	41	65.84	15	31	25	40.51
	33	Female	22	27	10	46	73.94	17	27	29	46.59
	34	Male	37	30	15	41	71.84	16	29	27	43.55
	35	Male	44	19	25	31	50.63	10	40	16	26.33
	36	Female	39	27	10	46	73.94	13	38	18	31.37
	37	Male	22	24	16	40	64.82	15	31	25	40.51
	38	Male	55	22	18	38	60.78	14	33	23	37.47
	39	Male	30	26	13	43	69.88	16	29	27	43.55
	40	Female	28	20	21	35	55.71	12	35	21	33.43
	41	Male	38	28	11	45	73.92	17	28	28	45.57
	42	Male	29	23	17	39	62.8	14	36	20	34.41
	43	Male	35	21	20	36	57.73	13	36	20	33.41
	44	Male	50	25	14	42	67.86	15	30	26	41.53
	45	Female	45	27	12	44	71.9	16	29	27	43.55
	46	Male	32	20	22	34	54.69	12	36	20	32.41
	47	Male	36	24	15	41	65.84	15	31	25	40.51
	48	Male	24	22	19	37	59.76	14	34	22	36.45
	49	Male	45	23	16	40	63.82	13	33	23	36.47

Continued Table A.1 General information and scores of the two groups of subjects

Group	Subject	Gender	Age	Before treatment				After treatment			
				FAS	SVS	SVSR	Composite score	FAS	SVS	SVSR	Composite score
Stimulation group (1~100)	50	Male	49	21	21	35	56.71	13	35	21	34.43
	51	Male	34	25	13	43	68.88	16	34	22	38.45
	52	Female	50	20	23	33	53.67	12	37	19	31.39
	53	Male	27	26	12	44	70.9	15	29	27	42.55
	54	Male	40	23	18	38	61.78	14	33	23	37.47
	55	Male	25	24	15	41	65.84	15	31	25	40.51
	56	Female	30	22	20	36	58.73	13	35	21	34.43
	57	Male	52	27	10	46	73.94	17	27	29	46.59
	58	Male	33	20	24	32	52.65	12	37	19	31.39
	59	Male	39	25	14	42	67.86	15	30	26	41.53
	60	Female	22	23	17	39	62.8	14	32	24	38.49
	61	Male	31	21	19	37	58.76	13	34	22	35.45
	62	Male	28	24	16	40	64.82	15	31	25	40.51
	63	Female	47	26	11	45	71.92	16	28	28	44.57
	64	Female	41	22	18	38	60.78	14	33	23	37.47
	65	Male	44	20	22	34	54.69	12	26	30	42.61
	66	Male	37	25	15	41	66.84	15	31	25	40.51
	67	Male	26	23	17	39	62.8	14	33	23	37.47
	68	Female	34	21	20	36	57.73	13	35	21	34.43
	69	Male	51	27	9	47	74.96	17	31	25	42.51
	70	Male	36	20	23	33	53.67	12	22	34	46.69
	71	Female	27	24	14	42	66.86	15	30	26	41.53
	72	Female	42	22	19	37	59.76	14	34	22	36.45
	73	Male	55	26	12	44	70.9	16	29	27	43.55
	74	Female	49	23	16	40	63.82	14	42	14	28.29

Continued Table A.1 General information and scores of the two groups of subjects

Group	Subject	Gender	Age	Before treatment				After treatment			
				FAS	SVS	SVSR	Composite score	FAS	SVS	SVSR	Composite score
Stimulation group (1~100)	75	Male	23	21	21	35	56.71	13	40	16	29.33
	76	Male	48	25	13	43	68.88	15	40	16	31.33
	77	Female	38	20	24	32	52.65	12	46	10	22.20
	78	Male	29	24	15	41	65.84	15	31	25	40.51
	79	Male	35	22	18	38	60.78	23	18	38	61.78
	80	Male	53	27	11	45	72.92	17	28	28	45.57
	81	Male	32	23	17	39	62.8	14	32	24	38.49
	82	Female	31	21	20	36	57.73	13	19	37	50.76
	83	Male	50	25	14	42	67.86	12	30	26	38.53
	84	Female	44	20	22	34	54.69	12	36	20	32.41
	85	Female	29	26	12	44	70.9	16	29	27	43.55
	86	Male	34	23	16	40	63.82	14	32	24	38.49
	87	Male	26	22	19	37	59.76	10	34	22	32.45
	88	Female	46	24	15	41	65.84	15	31	25	40.51
	89	Male	39	21	21	35	56.71	13	36	20	33.41
	90	Male	28	25	13	43	68.88	16	30	26	42.53
	91	Male	40	20	23	33	53.67	12	23	33	45.67
	92	Female	33	27	10	46	73.94	17	27	29	46.59
	93	Male	45	23	17	39	62.8	14	21	35	49.71
	94	Male	37	22	18	38	60.78	14	23	33	47.67
	95	Female	25	24	14	42	66.86	15	30	26	41.53
	96	Male	30	21	20	36	57.73	13	35	21	34.43
	97	Male	52	26	11	45	71.92	16	28	28	44.57
	98	Female	42	20	22	34	54.69	21	20	36	57.73
	99	Female	24	25	15	41	66.84	15	31	25	40.51

Continued Table A.1 General information and scores of the two groups of subjects

Group	Subject	Gender	Age	Before treatment				After treatment			
				FAS	SVS	SVSR	Composite score	FAS	SVS	SVSR	Composite score
Stimulation group (1~108)	100	Male	41	23	16	40	63.82	14	34	22	36.45
	101	Female	36	22	19	37	59.76	23	18	38	61.78
	102	Male	35	24	14	42	66.86	25	13	43	68.88
	103	Male	49	21	21	35	56.71	13	44	12	25.24
	104	Female	44	27	10	46	73.94	10	27	29	39.59
	105	Male	31	20	23	33	53.67	12	41	15	27.31
	106	Female	20	25	13	43	68.88	16	30	26	42.53
	107	Male	38	23	32	24	47.49	25	28	28	53.57
	108	Female	47	23	17	39	62.8	10	32	24	34.49
	109	Male	19	19	25	31	50.63	23	19	37	60.76
	110	Male	32	25	15	41	66.84	20	22	34	54.69
	111	Male	34	26	11	45	71.92	19	21	35	54.71
	112	Female	53	23	19	37	60.76	24	17	39	63.80
	113	Male	45	28	6	50	79.02	24	17	39	63.80
	114	Female	36	18	27	29	47.59	20	20	36	56.73
Control group (109~216)	115	Male	48	22	18	38	60.78	21	21	35	56.71
	116	Male	27	28	8	48	76.98	22	17	39	61.80
	117	Male	33	22	17	39	61.80	17	28	28	45.57
	118	Female	49	23	16	40	63.82	21	20	36	57.73
	119	Male	50	23	13	43	66.88	28	11	45	73.92
	120	Female	43	27	7	49	77.00	18	27	29	47.59
	121	Male	41	29	9	47	76.96	21	21	35	56.71
	122	Male	31	29	8	48	77.98	25	10	46	71.94
	123	Male	43	26	12	44	70.90	18	23	33	51.67
	124	Male	29	22	17	39	61.80	18	24	32	50.65

Continued Table A.1 General information and scores of the two groups of subjects

Group	Subject	Gender	Age	Before treatment				After treatment			
				FAS	SVS	SVSR	Composite score	FAS	SVS	SVSR	Composite score
Control group (109~216)	125	Male	42	28	10	46	74.94	21	16	40	61.82
	126	Male	39	25	10	46	71.94	27	9	47	74.96
	127	Female	47	21	22	34	55.69	18	25	31	49.63
	128	Female	33	19	21	35	54.71	22	16	40	62.82
	129	Male	42	22	21	35	57.71	18	22	34	52.69
	130	Male	44	27	10	46	73.94	26	9	47	73.96
	131	Male	29	23	13	43	66.88	22	17	39	61.80
	132	Female	38	23	19	37	60.76	20	19	37	57.76
	133	Male	51	21	21	35	56.71	22	17	39	61.80
	134	Male	38	24	18	38	62.78	20	24	32	52.65
	135	Male	34	24	15	41	65.84	23	19	37	60.76
	136	Male	41	23	19	37	60.76	19	21	35	54.71
	137	Male	34	21	21	35	56.71	19	25	31	50.63
	138	Male	41	25	14	42	67.86	21	17	39	60.80
	139	Male	35	23	17	39	62.80	25	11	45	70.92
	140	Male	36	24	12	44	68.90	16	29	27	43.55
	141	Male	41	17	28	28	45.57	19	24	32	51.65
	142	Male	49	24	16	40	64.82	23	17	39	62.80
	143	Female	41	29	5	51	81.04	23	14	42	65.86
	144	Female	51	26	10	46	72.94	21	18	38	59.78
	145	Male	30	24	15	41	65.84	27	12	44	71.90
	146	Male	52	22	22	34	56.69	25	15	41	66.84
	147	Female	24	25	13	43	68.88	20	21	35	55.71
	148	Male	35	27	18	38	65.78	22	19	37	59.76
	149	Male	22	23	17	39	62.80	26	14	42	68.86

Continued Table A.1 General information and scores of the two groups of subjects

Group	Subject	Gender	Age	Before treatment				After treatment			
				FAS	SVS	SVSR	Composite score	FAS	SVS	SVSR	Composite score
Control group (109~216)	150	Male	44	21	23	33	54.67	24	17	39	63.80
	151	Female	45	24	14	42	66.86	21	18	38	59.78
	152	Male	25	26	14	42	68.86	22	18	38	60.78
	153	Male	55	20	22	34	54.69	24	19	37	61.76
	154	Female	38	23	16	40	63.82	19	22	34	53.69
	155	Male	36	22	20	36	58.73	25	15	41	66.84
	156	Male	28	25	16	40	65.82	21	19	37	58.76
	157	Male	34	27	11	45	72.92	23	17	39	62.80
	158	Male	50	24	15	41	65.84	27	12	44	71.90
	159	Male	47	21	20	36	57.73	24	17	39	63.80
	160	Male	26	24	15	41	65.84	20	20	36	56.73
	161	Female	50	26	12	44	70.90	22	18	38	60.78
	162	Male	45	20	22	34	54.69	24	19	37	61.76
	163	Male	32	23	16	40	63.82	19	22	34	53.69
	164	Male	37	22	18	38	60.78	25	15	41	66.84
	165	Female	29	25	15	41	66.84	21	19	37	58.76
	166	Male	40	27	11	45	72.92	23	17	39	62.80
	167	Female	34	24	15	41	65.84	27	12	44	71.90
	168	Male	28	21	24	32	53.65	24	17	39	63.80
	169	Male	39	24	14	42	66.86	20	20	36	56.73
	170	Male	24	26	13	43	69.88	22	18	38	60.78
	171	Male	51	20	28	28	48.57	24	19	37	61.76
	172	Female	55	23	16	40	63.82	19	22	34	53.69
	173	Male	48	22	18	38	60.78	25	15	41	66.84
	174	Male	34	25	16	40	65.82	21	19	37	58.76

Continued Table A.1 General information and scores of the two groups of subjects

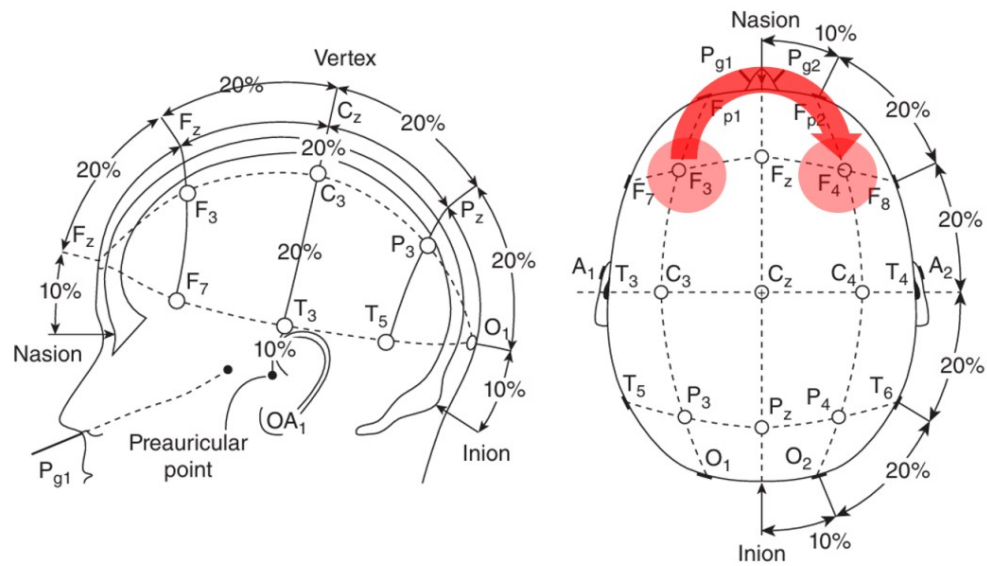
Group	Subject	Gender	Age	Before treatment				After treatment			
				FAS	SVS	SVSR	Composite score	FAS	SVS	SVSR	Composite score
Control group (109~216)	175	Female	27	27	11	45	72.92	23	17	39	62.80
	176	Male	38	24	15	41	65.84	27	12	44	71.90
	177	Male	29	21	20	36	57.73	24	17	39	63.80
	178	Female	23	24	14	42	66.86	20	20	36	56.73
	179	Male	33	26	12	44	70.90	22	18	38	60.78
	180	Male	49	20	22	34	54.69	24	19	37	61.76
	181	Male	44	23	16	40	63.82	19	22	34	53.69
	182	Female	36	22	18	38	60.78	25	15	41	66.84
	183	Male	55	25	18	38	63.78	21	19	37	58.76
	184	Male	35	27	11	45	72.92	23	17	39	62.80
	185	Male	26	24	15	41	65.84	27	12	44	71.90
	186	Female	52	21	20	36	57.73	24	17	39	63.80
	187	Male	41	24	14	42	66.86	20	20	36	56.73
	188	Male	28	26	14	42	68.86	22	18	38	60.78
	189	Male	31	20	22	34	54.69	24	19	37	61.76
	190	Female	47	23	16	40	63.82	19	22	34	53.69
	191	Male	40	22	18	38	60.78	25	15	41	66.84
	192	Male	49	25	18	38	63.78	21	19	37	58.76
	193	Male	38	27	11	45	72.92	23	17	39	62.80
	194	Female	25	24	15	41	65.84	27	12	44	71.90
	195	Male	46	21	20	36	57.73	24	17	39	63.80
	196	Male	25	24	14	42	66.86	20	20	36	56.73
	197	Male	45	26	12	44	70.90	22	18	38	60.78
	198	Male	37	20	22	34	54.69	24	19	37	61.76
	199	Male	52	23	16	40	63.82	19	22	34	53.69

Continued Table A.1 General information and scores of the two groups of subjects

Group	Subject	Gender	Age	Before treatment				After treatment			
				FAS	SVS	SVSR	Composite score	FAS	SVS	SVSR	Composite score
Control group (109~216)	200	Female	30	22	18	38	60.78	25	15	41	66.84
	201	Male	32	25	13	43	68.88	21	19	37	58.76
	202	Male	34	27	17	39	66.80	23	17	39	62.80
	203	Male	44	24	15	41	65.84	27	12	44	71.90
	204	Male	50	21	20	36	57.73	24	17	39	63.80
	205	Female	49	24	14	42	66.86	20	20	36	56.73
	206	Male	42	26	12	44	70.90	22	18	38	60.78
	207	Male	39	20	30	26	46.53	24	19	37	61.76
	208	Female	41	23	16	40	63.82	19	22	34	53.69
	209	Male	36	22	18	38	60.78	25	15	41	66.84
	210	Male	28	25	13	43	68.88	21	19	37	58.76
	211	Female	33	27	17	39	66.80	23	17	39	62.80
	212	Male	30	24	19	37	61.76	27	12	44	71.90
	213	Male	24	21	26	30	51.61	24	17	39	63.80
	214	Female	44	24	14	42	66.86	20	20	36	56.73
	215	Male	29	26	16	40	66.82	22	18	38	60.78
	216	Male	53	20	22	34	54.69	24	19	37	61.76

Appendix B

Schematic diagram of intervention points based on the 10-20 international standard system



Appendix C Fatigue Assessment Scale (sample format)

Fatigue assessment scale, FAS

No.: _____ Date of Completion: _____ Gender: ☐ M ☐ F Age: _____

The following 10 statements refer to how you usually feel. Select the option that best applies to your situation and mark it with "✓".	Rating				
1. I am bothered by fatigue	1	2	3	4	5
2. I get tired quickly	1	2	3	4	5
3. I cannot do much in a day	1	2	3	4	5
4. I have enough energy to live every day	1	2	3	4	5
5. I feel physically exhausted	1	2	3	4	5
6. I find it difficult to start things	1	2	3	4	5
7. I have trouble thinking carefully	1	2	3	4	5
8. I have no interest in anything	1	2	3	4	5
9. I feel sluggish	1	2	3	4	5
10. When I do something, I can concentrate on it	1	2	3	4	5

Note: All items are scored on a 5-point scale from 1 to 5. The standards for each level are: "1" means never, "2" means sometimes, "3" means usually, "4" means often, and "5" always.

The following information is summarized by the evaluator based on the
information filled in by the subjects

Total score T_____ = _____×1 + _____×2 + _____×3 + _____×4 + _____×5

Evaluator:_____

Appendix D Subjective vitality scale (sample format)

Subjective vitality scale, SVS

No.: _____ Date of Completion: _____ Gender: ☐ M ☐ F Age: _____

Regarding the different feelings people have about energy, please select the option with which you agree most. (mark your answer with “ ✓ ”)	Rating						
1. I feel energetic and alive.	1	2	3	4	5	6	7
2. I don’ t feel very energetic. (R)	1	2	3	4	5	6	7
3. Sometimes I feel so energized that I just want to explode.	1	2	3	4	5	6	7
4. I have energy and spirit.	1	2	3	4	5	6	7
5. I look forward to every new day.	1	2	3	4	5	6	7
6. I almost always feel alert and awake.	1	2	3	4	5	6	7
7. I feel energetic	1	2	3	4	5	6	7

Note: (R) means reverse scoring. All items use a 7-point scoring method from 1 to 7. “1” means strongly disagree and “7” means strongly agree

The following information is summarized by the evaluator based on the
information filled in by the subjects

Total score T_____ = _____×1 + _____×2 + _____×3 + _____×4
+ _____×5+ _____×6 + _____×7

Evaluator:_____